

# Glossary



## Glossary

**Aerosol:** Particulate material, other than water or ice, in the atmosphere.

**Anaerobic fermentation:** Fermentation that occurs under conditions where oxygen is not present. For example, methane emissions from landfills result from anaerobic fermentation of organic waste in the landfills.

**Anthropogenic:** Relating to the influence of human beings on nature. For instance, "anthropogenic" emissions of greenhouse gases are emissions resulting from human activities such as burning gasoline in motor vehicles or burning coal to generate electricity.

**Anthropogenic emissions:** Any emissions resulting from human activities.

**Atmosphere:** The envelope of air surrounding the Earth and bound to it by the planet's gravitational attraction.

**Baseline forecast:** A baseline forecast is used to outline future energy demand under a business-as-usual scenario and show where opportunities lie for energy savings and environmental improvement. A baseline forecast describes what would most likely happen if current trends continue and if no changes occur in state and national energy policy. Other scenarios, incorporating new policies, new technologies, alternative economic conditions and other assumptions, may be contrasted to this baseline case.

**Baseload:** A baseload plant is normally operated to provide all or part of the minimum electric load of a utility system. Baseload units are generally run continuously to produce electricity at a constant rate, allowing for planned maintenance and forced outages.

**Biomass:** Organic matter that is available on a renewable basis including forest residues, agricultural crops and wastes, wood and wood waste, animal wastes, livestock operation residue, and aquatic plants. Useful energy can be derived from the direct combustion of biomass or flammable gases derived from biomass for generation of electricity, mechanical power, or industrial process heat. In this report, biomass usually refers to wood and wood waste.

**British thermal unit (Btu):** The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit. It is commonly used as a measurement for the energy content of different fuels or energy sources. One kWh equals 3,412 BTU.

**Carbon cycle:** The continual circulation of carbon between the atmosphere, soil and rocks, oceans and living plants and animals. Carbon, a chemical element, is a constituent of all living matter. One form in which carbon resides in the atmosphere is carbon dioxide (CO<sub>2</sub>).

**Carbon reservoir or sink:** A physical site within the carbon cycle where carbon is stored, such as the atmosphere, oceans, Earth's vegetation and soils (in forests, for example), and fossil fuel deposits.

**Carbon source and carbon sink:** Terms used to describe the exchange of carbon in the carbon cycle. For instance, when wood is burned, producing CO<sub>2</sub>, the carbon "source" is biomass and the "sink" is the atmosphere.

**Carbon dioxide (CO<sub>2</sub>):** A molecule made up of one atom of carbon and two atoms of oxygen. Sources include respiration (breathing) in animals and the burning of organic matter or fossil fuels. Plants use CO<sub>2</sub> in the process of photosynthesis.

**Carbon monoxide (CO):** A molecule comprised of one atom of carbon and one atom of oxygen. An odorless, invisible gas, it is created when carbon-containing fuels are burned incompletely. It is not a greenhouse gas, but it is short-lived and often transforms into CO<sub>2</sub>. It has harmful effects on human health.

**Chlorofluorocarbons (CFCs):** A family of inert non-toxic and easily liquefied chemicals used in refrigeration, air conditioning, packaging, and insulation or as solvents or aerosol propellants. Because they are not destroyed in the lower atmosphere, they drift into the upper atmosphere where their chlorine components destroy ozone.

**Climate change:** Long-term fluctuations in temperature, precipitation, wind and all other aspects of the climate. Over thousands of years, climate change occurs naturally. Controversy centers over whether humans are now causing climate to change over relatively short periods of time such as one to two human generations.

**Coalification:** The geologic process which results in the formation of coal.

**Combined cycle plant:** A combined cycle plant utilizes the most efficient large-scale thermal electric generation technology available today. Combined cycle technology uses the excess heat produced by a combustion turbine to power an additional turbine that produces even more electricity. Using the waste heat from the combustion turbine to produce more electricity dramatically improves the efficiency of the plant. Nearly all commercially available combined cycle plants and advanced combustion turbines are fired by natural gas. Compared to conventional oil- or coal-fired generators, they require less fuel and have fewer emissions per unit of electricity produced.

**Demand-side management:** The planning, implementation, and monitoring of electric utility activities designed to reduce customer use of electricity. Regulated utilities that are required to service a specific customer base have pursued DSM as an approach to meeting load requirements when it is more cost-effective than other available supply side resources such as construction of a new power plant or wholesale purchase of power.

**Enteric fermentation:** Fermentation that occurs in the intestines. For example, methane emissions produced as part of the normal digestive processes of ruminant animals is referred to as "enteric fermentation."

**Flaring:** Combusting a gas such as methane at the point at which it would otherwise be released into the atmosphere; as a result of flaring, the gas does not enter the atmosphere although the byproducts of combustion may enter the atmosphere.

**Fossil fuels:** Fuel resources (coal, oil and natural gas) embedded in the earth's crust that were created from the bodies of animals and plants by geologic processes lasting millions of years. Because they were created from organic matter, they contain carbon. When they are burned as fuels, this carbon is released as CO<sub>2</sub>.

**Global Warming Potential (GWP):** The concept of the Global Warming Potential has been developed for policy-makers as a measure of the possible warming effect on the surface-troposphere system arising from the emissions of each gas relative to CO<sub>2</sub>.

**Global warming:** A popular term for climate change that may result from anthropogenic emissions of greenhouse gases. In the "global warming" scenario, temperature around the globe rises several degrees in a short period of time.

**Greenhouse effect:** Describes the role of greenhouse gases in trapping heat, thereby keeping the Earth's surface warm enough to sustain life as we know it. Scientists agree that the greenhouse effect is real. Controversy centers over the degree to which human activities are increasing concentrations of greenhouse gases in the atmosphere, thereby increasing the amount of heat trapped and affecting climate.

**Greenhouse gases:** Those gases--such as carbon dioxide, methane, nitrous oxide and ozone--that let radiation from the sun reach the earth but trap outgoing heat. Their action is analogous to that of glass in a greenhouse.

**Hydrochlorofluorocarbons (HCFCs):** HCFCs are essentially chlorofluorocarbons (CFCs) that include one or more hydrogen atoms. The presence of hydrogen makes the resulting compounds less stable, and as a result they have shorter atmospheric lifetimes than CFCs and are less likely to drift into the upper atmosphere where their chlorine components would destroy ozone. They are popular interim substitutes for CFCs, but international agreements have slated HCFCs for elimination by 2030. Like CFCs, HCFCs are potent greenhouse gases; however, they have weaker indirect cooling effects than CFCs.

**Hydrofluorocarbons (HFCs):** HFCs are essentially hydrochlorofluorocarbons (HCFCs) without the chlorine. Because they do not destroy ozone, they are widely used as substitutes for CFCs and HCFCs. Although HFCs do not deplete ozone, they are powerful greenhouse gases and lack the indirect cooling effects of CFCs and HCFCs. For example, HFC-23 has a GWP of 10,000.

**kiloWatt-hour (kWh):** A unit of energy equivalent to using one kiloWatt of electricity for one hour, equal to 3,412 BTUs.

**Methane (CH<sub>4</sub>):** A molecule made up of one atom of carbon and four atoms of hydrogen. Methane is a greenhouse gas which contributes about 10 percent of Missouri emissions and 18 percent of global emissions. Anthropogenic sources of methane include wetland rice cultivation, enteric fermentation by domestic livestock, anaerobic fermentation of organic wastes, coal mining, biomass burning, and the production, transportation, and distribution of natural gas.

**Nitrogen Oxides:** (NO<sub>x</sub>): NO<sub>x</sub> refers collectively to NO, a molecule made up of one atom of nitrogen and one atom of oxygen, and NO<sub>2</sub>, a molecule made up of one atom of nitrogen and two atoms of oxygen. NO<sub>x</sub> is created in lightning, in natural fires, in fossil-fuel combustion, and in the stratosphere from N<sub>2</sub>O. It plays an important role in the global warming process due to its contribution to the formation of ozone (O<sub>3</sub>).

**Nitrous Oxide (N<sub>2</sub>O):** A molecule made up of two atoms of nitrogen and one atom of oxygen. Nitrous oxide is a greenhouse gas which contributes about two percent of Missouri emissions and five percent of global emissions. Nitrous oxide is produced from a wide variety of biological and anthropogenic including application of nitrogenous fertilizers, consumption of fuel and various production processes such as manufacture of nitric acid.

**Nonmethane Volatile Organic Compounds (NMVOCs):** NMVOCs are frequently divided into methane and non-methane VOCs (see definition of Volatile Organic Compounds). NMVOCs include compounds such as propane, butane and ethane.

**Ozone (O<sub>3</sub>):** A molecule comprised of three atoms of oxygen. Ozone (O<sub>3</sub>) exists in both the lower atmosphere (troposphere) and upper atmosphere (stratosphere). In the troposphere, ozone is an ingredient of smog. However, in the stratosphere, it provides a protective layer that shields the Earth from ultraviolet radiation.

**Ozone depletion:** Scientists generally agree that certain manufactured chemicals such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) remove ozone from the stratosphere where it normally provides a protective shield from ultraviolet radiation. Collectively, these chemicals are called Ozone Depleting Compounds (ODCs). The removal of ozone is called "ozone depletion" and is a separate policy issue that should not be confused with "climate change" or "global warming." The two issues are often discussed together because several ODCs are also potent greenhouse gases.

**Perfluorinated Carbons (PFCs):** PFCs are powerful greenhouse gases whose molecules consist of carbon and fluorine atoms. PFCs are emitted during electrolytic reduction of alumina in the primary reduction process.

**Sequestered carbon:** Carbon that is "trapped" in some part of the carbon cycle other than the atmosphere. For example, the carbon content of coal is sequestered until the coal is burned and carbon returns to the atmosphere as CO<sub>2</sub>. Plants sequester carbon when they convert CO<sub>2</sub> to plant material.

**Sequestration:** A process by which carbon dioxide is removed from the atmosphere and isolated for some period in a carbon reservoir such as forest biomass or wood products.

**Short Tons Carbon Dioxide Equivalent (STCDE):** Emissions of methane, nitrous oxide and PFCs are reported in this unit of measurement. The derivation of this unit of common measure is based on Global Warming Potential (GWP) factors for the different gases.

**Stratosphere:** Region of the upper atmosphere extending upward from an altitude between six and nine miles to an altitude of about 30 miles.

**Trace Gas:** A minor constituent of the atmosphere. The most important trace gases contributing to the greenhouse effect include water vapor, carbon dioxide, ozone, methane, ammonia, nitric acid, nitrous oxide, and sulfur dioxide.

**Troposphere:** The inner layer of the atmosphere, extending upward to an altitude of six to nine miles. Within the troposphere, there is normally a steady decrease of temperature with increasing altitude. Nearly all clouds form and weather conditions occur within the troposphere.

**Utility Restructuring:** The reconfiguration of the vertically integrated electric utility in the context of electric utility deregulation. Reconfiguration refers to separation of the various utility functions such as generation, transmission, distribution and customer services into individually operated and owned entities. Electric utility deregulation refers to the modification or elimination of regulation from the previously regulated utility industry.

**Volatile Organic Compounds (VOCs):** Volatile organic compounds, along with nitrogen oxides, are participants in atmospheric chemical and physical processes that result in the formation of ozone and other photochemical oxidants. The largest sources of reactive VOC emissions are transportation sources and industrial processes. Miscellaneous sources, primarily forest wildfires and non-industrial consumption of organic solvents, also contribute significantly to total VOC emissions.